

December 21, 1965

Development of Improved Method for Measurement of Spectral Irradiances from  
Solar Simulators

(NBS Status Report No. 5 to NASA on P. O. R-116 dated January 1, 1966)

1080 Code Xone  
66 81130  
ER69416

With reference to our previous report under date of July 20, 1965, work has continued with the operation of the Brower Amplifier, Model 129, together with a Carl Leiss double quartz prism spectrometer in measurements on other high intensity arcs through the spectral region of 0.25 to 2.5 microns. This equipment was also transported to another NBS laboratory and employed in evaluating the spectral emission of a 6000-watt Xenon lamp source within a few hours time.

Considerable emphasis has been placed upon an evaluation of the total irradiance from groups of 100-watt, 500-watt, and 1000-watt projection-type lamps for use as new standards in this area. This program is nearing completion after which standards of these types will be available to other laboratories and for use in the NASA program. Commercial issuance will be handled through a qualified laboratory- the Eppley Laboratory, Newport, R. I.

We have been involved in an associated research project in solar radiation with the USPHS for the past two years. As a result considerable instrumentation has been set up and measurements were made of the spectral solar ultraviolet irradiance on a horizontal surface at Mt. Wilson and in downtown Los Angeles, California for a period of about 4 weeks between September 20 and October 20. Following discussions at Mt. Wilson among personnel of this laboratory of NBS, Jet Propulsion Laboratory, and The Eppley Laboratory, and also with Mr. Mook's Office in Washington, it was decided to move the USPHS equipment to Table Mountain at the conclusion of the USPHS work and measure the spectral ultraviolet solar irradiance normal to the solar beam to obtain some extraterrestrial solar data similar to those reported in NBS Research Paper No. 2710 for correlation with proposed X-15 measurements by the Eppley Laboratory working in conjunction with the Jet Propulsion Laboratory. Some very good data were obtained. However, bad weather (smog, clouds, and later rain) curtailed the measurements after about six good days for observation. It is hoped that this work can be continued for a few weeks during the coming summer when the sun is nearer to the observer's latitude - and at a station relatively free of polluted atmosphere. Possible suggested locations are Kitts Peak, Sacramento Peak or Manna Loa.

During a recent visit to the Ames Research Center while in California we were pleased to learn that our primary spectroradiometer - amplifier equipment developed for making spectral measurements of solar simulators was being duplicated at one of their laboratories for use in spectral measurements on high intensity solar simulators. Discussions with NASA personnel indicate other laboratories are also in the process of setting up similar equipment.

Associated closely with, but not directly a part of this project, has been the issuance of 1000-watt quartz-iodine lamp standards of spectral irradiance. The demand for these standards has continued to be heavy; nearly 170 of the new standards have been supplied to various laboratories. Because we cannot meet this continued demand and at the same time develop new and improved standards, we are beginning to refer requests for spectral irradiance standards to The Eppley Laboratory, Newport, R. I.